

Notice of Allowability

Application No.

09/973,849

Examiner

Michael P. Stafira

Applicant(s)

SUBRAMANIAN ET AL.

Art Unit

2877

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to amendment filed 10/2/2003.
2. ☒ The allowed claim(s) is/are 6-28.
3. ☒ The drawings filed on 10 October 2001 are accepted by the Examiner.
4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) ☐ All b) ☐ Some* c) ☐ None of the:
 1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
 6. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
 - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
 - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
 - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).**
7. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☐ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO-1449 or PTO/SB/08), Paper No./Mail Date _____
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application (PTO-152)
6. ☐ Interview Summary (PTO-413), Paper No./Mail Date _____
7. ☐ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____

DETAILED ACTION

Allowable Subject Matter

1. Claims 6-28 are allowed over the prior art of record.
2. The following is an examiner's statement of reasons for allowance:

Regarding claim 6, the prior art fails to disclose or make obvious a system of monitoring development of a selectively irradiated photoresist material layer having a measuring system operably coupled to the at least one detector, the measuring system adapted to receive the signal corresponding to the intensity of the ray of light and convert the signal to digital data, the measuring system measuring at least one of volume of developer, concentration of developer and period of contact time between developer and selectively irradiated photoresist; and a processor operatively coupled to the measuring system, the processor adapted to receive the digital data from the measuring system and analyze the digital data wherein the difference of the intensity of the ray of light from the at least one light source to when it is received by at least one detector is proportional to an amount of water generated across the selectively irradiated photoresist material layer due to an interaction of a developer and an acid in the selectively irradiated photoresist material layer, and in combination with the other recited limitations of claim 6.

Claims 7-12, 24-26 are allowed by the virtue of dependency on the allowed claim 6.

Regarding claim 13, the prior art fails to disclose or make obvious a system of controlling development of a selectively irradiated photoresist material layer having a measuring system to measure an amount of water generated on the selectively irradiated photoresist material layer due to an interaction of the developer and an acid in the selectively irradiated photoresist material layer, the measuring system further measuring at least one of volume of developer, concentration

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of developer and period of contact time between developer and selectively irradiated photoresist; and a processor operatively coupled to the measuring system and a developer volume and concentration control system, the processor receiving data from the measuring system relating to the amount of water measured and the processor using the data to determine acid consumption of the selectively irradiated photoresist material layer, the processor being further adapted to provide adjustment information to the developer volume and concentration control system for adjusting at least one of the volume of developer, the concentration of developer and the period of contact time, so that a subsequent selectively irradiated photoresist material layer having a more uniform development can be achieved, and in combination with the other recited limitations of claim 13. Claims 14-18, 27, 28 are allowed by the virtue of dependency on the allowed claim 13.

Regarding claim 19, the prior art fails to disclose or make obvious a system of developing a selectively irradiated photoresist material layer disposed on a semiconductor wafer having means for measuring the amount of water, the measuring means further measuring at least one of volume of developer concentration of developer and period of contact time between developer and selectively irradiated photoresist; and means for determining an amount of acid consumption based on the amount of water measured, and in combination with the other recited limitations of claim 19. Claims 20-23 are allowed by the virtue of dependency on the allowed claim (?).

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue

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fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael P. Stafira whose telephone number is 571-272-2430. The examiner can normally be reached on 4/10 Schedule Mon.-Thurs..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory Toatley can be reached on 571-272-2800 ext. 77. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Michael P. Stafira
Primary Examiner
Art Unit 2877

September 2, 2004